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EXAMINER
RAMIREZ, DELIA M

ART UNIT	PAPER NUMBER
1652	19

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/541,462	XIONG ET AL.	
	Examiner	Art Unit	
	Delia M. Ramirez	1652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 March 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-48* is/are pending in the application.

4a) Of the above claim(s) *8-12 and 17-48* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5-7 and 13-16* is/are rejected.

7)☒ Claim(s) *3 and 4* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☒ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *5,9,18* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Status of the Application

Claims 1, 3-48 are pending.

Applicant's amendment of claims 1, 2-5, 13, 16, cancellation of claim 2, and election with traverse of Group I, claims 1-7, 13-16, drawn to the polynucleotide of SEQ ID NO: 1, a polynucleotide encoding the polypeptide of SEQ ID NO: 2, cells and vectors comprising said polynucleotides, and a method of producing the polypeptide of SEQ ID NO: 2, in Paper No. 17, filed on 3/26/2003 is acknowledged.

Applicant's traverse is on the ground(s) that it would not be an undue burden to examine the claims of Groups I-XII concurrently. In particular, Applicants argue that examining Groups I and II would not present an undue burden since the examination of claims in Group I would also involve a search of the proteins in Group II.

While it is true that publications containing polynucleotide (Group I) information such as open reading frame sequences typically disclose the corresponding polypeptide (Group II), it is false to assume that the only source of information about a polypeptide is one in which polynucleotide information is disclosed. Therefore, the Examiner must search not only for polynucleotide but also for polypeptide information. In regard to searching Groups I-XII concurrently, the Examiner disagrees with Applicant's contention that the search of all groups would not impose an undue burden on the Office since a comprehensive search of all groups would require sequence searches, patented and non-patented literature searches, class/subclass searches, which are not co-extensive.

The requirement is deemed proper and therefore is made FINAL.

Claims 8-12, 17-48 are withdrawn from further consideration by the Examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Priority

1. Acknowledgment is made of a claim for domestic priority under 35 U.S.C. 119(e) to provisional application No. 60/127,261 filed on 03/31/1999.

Oath/Declaration

2. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because while the first paragraph of the specification claims priority to provisional application No. 60/166127 filed 11/22/1999, the declaration claims priority to unrelated provisional application No. 60/133927.

Information Disclosure Statement

3. The information disclosure statements (IDS) submitted on 8/4/2000, 12/8/2000 and 3/26/2003 are acknowledged. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Drawings

4. The drawings have been reviewed and are objected under 37 CFR 1.84 or 1.152. See attached Notice of Draftsperson's Patent Drawing Review. Applicant is required to submit the drawing corrections within the time period set in the attached Office communication. See 37 CFR 1.85(a). Failure to take corrective action within the set period will result in ABANDOMENT of the application. In addition, if amendments to the specification are needed due to drawing corrections, Applicant is requested to submit such amendments while the case is being prosecuted to expedite the processing of the application.

Claim Objections

5. Claims 1, 3, 13 are objected to because of the recitation of "ROC1". Abbreviations unless otherwise obvious and/or commonly used in the art, should not be recited in the claims without at least once reciting the entire phrase for which the abbreviation is used. Appropriate correction is required.

6. Claim 13 is objected to due to the recitation of "oligonucleotide complementary to the nucleic acid sequence encoding..". For consistency, it is suggested that the term "oligonucleotide complementary to the nucleic acid sequence encoding.." be amended to recite "oligonucleotide complementary to the nucleic acid encoding..". Appropriate correction is required.

7. Claim 16 is objected to due to the recitation of "nucleic acid sequence encoding a protein comprising". For clarity, it is suggested that the term be amended to recite "nucleic acid

encoding a protein.." since it is the nucleic acid what encodes a protein. Appropriate correction is required.

Claim Rejections - 35 USC § 112, Second Paragraph

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 1, 5-7, 13-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

10. Claim 1 (claims 5-7 dependent thereon) is indefinite in the recitation of "sequence that hybridizes to the nucleic acid sequence.." for the following reasons. First, it is unclear as to how a sequence can hybridize to another sequence since as known in the art, hybridization occurs among nucleic acid molecules. A sequence is a graphical representation of the order in which nucleotides/amino acids are arranged in a molecule. Furthermore, the term "stringent conditions" is indefinite absent a statement indicating the conditions under which the hybridization is performed. Nucleic acids which will hybridize under some hybridization conditions will not necessarily hybridize under different conditions. It is noted that the specification refers to at least two stringent conditions: reduced and medium. It is suggested that the claim be amended to recite "an isolated nucleic acid encoding a....[name of protein], selected from the group consisting of: (a) a nucleic acid comprising the nucleotide sequence of SEQ ID NO: 1, (b) a nucleic acid which hybridizes....to the nucleic acid of (a) under [hybridization/wash conditions], (c) a nucleic acid which differs from the nucleic acids of (a) or (b) due to....., (d) a

nucleic acid having a sequence which is at least ...identical to SEQ ID NO: 1". For examination purposes, the term "stringent conditions" will be interpreted as "any conditions". Correction is required.

11. Claim 13 (claims 14-15 dependent thereon) is indefinite in the recitation of "antisense oligonucleotide complementary to the nucleic acid sequence encoding ROC1 of claim 1 and having a length sufficient to hybridize thereto under physiological conditions" for the following reasons. First, it is unclear as to the meaning of the term "length sufficient" within the context of the claim since this is a relative term for which there is no standard disclosed in the claim or in the specification. In addition, the term "hybridize" is indefinite in the absence of a statement indicating which are the hybridization/wash conditions under which the hybridization takes place. Furthermore, the term "physiological conditions" is indefinite since the term has not been defined in the specification or the claim. It is noted that physiological conditions in humans may not be the same in other organisms. For examination purposes, the claim will be interpreted as being drawn to a polynucleotide which comprises any fragment of the complete complement of the polynucleotide of SEQ ID NO: 1. Correction is required.

12. Claim 14 is indefinite in the recitation of "DNA encoding an antisense oligonucleotide of claim 13" as it is unclear what is being claimed. The Examiner cannot determine the meaning of the term and how it further limits claim 13. If Applicant's intended limitation is "the polynucleotide of claim 13, wherein said polynucleotide is DNA", it is suggested that the claim be amended accordingly. For examination purposes, it will be assumed that claim 14 is a duplicate of claim 13 and, as such, it will be interpreted as indicated above. Correction is required.

Claim Rejections - 35 USC § 112, First Paragraph

13. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

14. Claims 1, 5-7, 13-16 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1 is directed to a genus of nucleic acids encoding a ROC1 protein wherein said nucleic acids hybridize under any conditions to the polynucleotide of SEQ ID NO: 1. Claims 5-7 are drawn to vectors and cells comprising the genus of polynucleotides as described above. Claims 13-14 are drawn to a genus of polynucleotides comprising any fragment of the complete complement of the polynucleotide of SEQ ID NO: 1. See claim rejections under 35 USC 112, second paragraph above for claim interpretation. Claim 15 is drawn to vectors comprising the genus of polynucleotides as described above in regard to claim 13. Claim 16 is drawn to a method of making polypeptides of any function comprising a fragment of the polypeptide of SEQ ID NO: 2. While the specification has disclosed the structure and function of the polypeptide of SEQ ID NO: 2 and the corresponding polynucleotide (SEQ ID NO: 1), there is no disclosure of (1) the critical structural elements required in a polynucleotide which can hybridize under any conditions to the polynucleotide of SEQ ID NO: 1, (2) the functions of polynucleotides comprising fragments of the complete complement of the polynucleotide of

SEQ ID NO: 1, or (3) the functions of polypeptides comprising any fragment of the polypeptide of SEQ ID NO: 2.

In regard to claims 1, 5-7, an adequate description of a genus of polypeptides may be achieved by a recitation of a representative number of polynucleotides defined by their nucleotide sequence or a recitation of structural features common to members of the genus, which features constitute a substantial portion of the genus. The recited structural feature of the genus (i.e. hybridize under any conditions to the polynucleotide of SEQ ID NO: 1) does not constitute a substantial portion of the genus since the remainder of the structure of any polynucleotide encoding a ROC1 protein is completely undefined and the specification does not provide the remaining structural features necessary for members of the genera to be selected.

In regard to claims 13-16, it is noted that the genus of polynucleotides and polypeptides as encompassed by the claims may include polynucleotides and polypeptides of many functions. While one could argue that the genus of polynucleotides and polypeptides of the instant claims are adequately described since one can isolate these polynucleotides/polypeptides by structural (i.e. sequence) comparison using the polynucleotide/polypeptide structures disclosed in the instant application or the prior art, the state of the art teaches that sequence comparison alone should not be used to determine function and that small structural changes can drastically change function. Bork (Genome Research, 10:398-400, 2000) teaches protein function is context dependent, and both molecular and cellular aspects must be considered (page 398). Witkowski et al. (Biochemistry 38:11643-11650, 1999) teaches that one amino acid substitution transforms a β-ketoacyl synthase into a malonyl decarboxylase and completely eliminates β-ketoacyl synthase activity. Van de Loo et al. (Proc. Natl. Acad. Sci. 92:6743-6747, 1995) teaches that polypeptides

of approximately 67% homology to a desaturase from *Arabidopsis* where found to be hydroxylases once tested for activity. Seffernick et al. (J. Bacteriol. 183(8):2405-2410, 2001) teaches that two naturally occurring Pseudomonas enzymes having 98% amino acid sequence identity catalyze two different reactions: deamination and dehalogenation, therefore having different function. Broun et al. (Science 282:1315-1317, 1998) teaches that as few as four amino acid substitutions can convert an oleate 12-desaturase into a hydrolase and as few as six amino acid substitutions can transform a hydrolase to a desaturase. The specification only discloses the polynucleotide of SEQ ID NO: 1 and the polypeptide of SEQ ID NO: 2, which is insufficient to put one of ordinary skill in the art in possession of all attributes and features of all species within the genera. Thus, one skilled in the art cannot reasonably conclude that Applicant had possession of the claimed invention at the time the instant application was filed.

15. Claims 1, 5-7, 13-16 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the polynucleotide of SEQ ID NO: 1 and the polypeptide of SEQ ID NO: 2, does not reasonably provide enablement for (1) any polynucleotide encoding a ROC1 protein which hybridizes under any conditions to the polynucleotide of SEQ ID NO: 1, (2) any polynucleotide of any function which comprises any fragment of the complete complement of the polynucleotide of SEQ ID NO: 1, or (3) any polypeptide of any function comprising any fragment of the polypeptide of SEQ ID NO: 2. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

The criteria for undue experimentation, summarized in *re Wands*, 8, USPQ2nd 1400 (Fed. Cir. 1988) are: 1) quantity of experimentation necessary, 2) the amount of direction or guidance presented, 3) the presence and absence of working examples, 4) the nature of the invention, 5) the state of prior art, 6) the relative skill of those in the art, 7) the predictability or unpredictability of the art, and 8) the breath of the claims.

The scope of the claims, as described above, is not commensurate with the enablement provided by the disclosure with regard to the extremely large number of polynucleotides and polypeptides encompassed by the claims. As indicted above, while Applicants have disclosed the function and structure of the polypeptide of SEQ ID NO: 2 and its corresponding polynucleotide, no disclosure of the functions of polynucleotides comprising any fragment of the complete complement of the polynucleotide of SEQ ID NO: 1 or the functions of polypeptides which comprise any fragment of the polypeptide of SEQ ID NO: 2. Furthermore, the specification has not disclose the critical structural elements required in a polynucleotide to encode a ROC1 protein.

As indicated previously, the current state of the art indicates that small structural changes can drastically change function. See, for example, the teachings of Van de Loo et al., Seffernick et al., Witkowski et al. and Broun et al., already discussed. The amino acid sequence of the polypeptide determines its structural and functional properties, therefore, one of skill in the art would require some knowledge and guidance as to how structure is related to function in order to (1) determine the function of a polypeptide which comprises a fragment of the polypeptide of SEQ ID NO: 2 or a polynucleotide which comprises a fragment of the complete complement of the polynucleotide of SEQ ID NO: 1, or (2) isolate polynucleotides encoding ROC1 proteins

which hybridize under any conditions to the polynucleotide of SEQ ID NO: 1. Therefore, due to the lack of relevant examples, the amount of information provided, the lack of knowledge about the critical structural elements required to display the desired function, and the unpredictability of the prior art in regard to function based on homology, one of ordinary skill in the art would have to go through the burden of undue experimentation in order to (1) determine the function of, and (2) screen and isolate those polynucleotides/polypeptides as encompassed by the claims with the desired function. Thus, Applicant has not provided sufficient guidance to enable one of ordinary skill in the art to make and use the invention in a manner reasonably correlated with the scope of the claims.

Claim Rejections - 35 USC § 102

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

16. Claim 1 is rejected under 35 U.S.C. 102(a) as being anticipated by the A. thaliana gene coding for the ROC1 protein disclosed by Applicants as prior art. As asserted by Applicants in page 57 (Example 8) an Arabidopsis gene coding for a ROC1 protein was found by Applicants in a database. An alignment of the human ROC1 (ROC1-Hs) and A. thaliana ROC1 (ROC1-At) proteins is shown in Figure 2C. According to the specification, the human ROC1 and the A. thaliana ROC1 proteins share 98% sequence identity (page 57, lines 21-22). In view of this high homology, the polynucleotide encoding the A. thaliana ROC1 protein found in the databases will hybridize to the polynucleotide of SEQ ID NO: 1 under any conditions.

It is noted that Okresz (GenEMBL accession number AY052401) teaches an A. thaliana polynucleotide/polypeptide wherein the polypeptide has 118 amino acids and comprises the entire fragment disclosed in Figure 2C.

17. Claims 1, 13 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Arino et al. (GenBank accession number CAA99155, August 1997). Arino et al. teaches a polynucleotide/polypeptide with an open reading frame (ORF) labeled YOL133w (see Definition in the GenBank entry provided) which has ROC1 activity, as evidenced by the disclosure. The disclosure (page 62, Example 12, lines 9-10) teaches that ORF YOL133w is a yeast ROC gene and that it shares 67% sequence identity with the human ROC1. As such, the polynucleotide of Arino et al. will hybridize to the polynucleotide of SEQ ID NO: 1 under any conditions. Since claim 1 is directed to a polynucleotide which would hybridize to the polynucleotide of SEQ ID NO: 1 under any conditions, the teachings of Arino et al. anticipate the claim as written. In regard to claims 13 and 14, since these claims are drawn to any polynucleotide which comprises a fragment of the complete complement of the polynucleotide of SEQ ID NO: 1 (see claim interpretation above), the teachings of Arino et al. also anticipate these claims since the complete complement of the polynucleotide of Arino et al. comprises fragments of the complete complement of the polynucleotide of SEQ ID NO: 1. See attached alignment.

Claim Rejections - 35 USC § 103

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

19. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

20. Claims 5-7, 15, 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arino et al. (GenBank accession number CAA99155, August 1997). The teachings of Arino et al. have been discussed above. Arino et al. does not teach an expression vector, a host cell or a method of producing the yeast ROC1 protein.

Claims 5-7 are drawn to expression vectors and host cells comprising a polynucleotide which can hybridize under any conditions to the polynucleotide of SEQ ID NO: 1 whereas claim 16 is drawn to a method of making a polypeptide which comprises a fragment of the polypeptide of SEQ ID NO: 2.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make an expression vector, transform a host cell and cultivate said transformed cell for the recombinant production of the ROC1 protein. A person of ordinary skill in the art is motivated to construct such a vector, transform a host cell and produce the protein recombinantly to obtain large amounts of ROC1 protein for further study and characterization.

One of ordinary skill in the art has a reasonable expectation of success at making the vector, transform a host cell and producing the protein recombinantly since vector construction, cell transformation and cultivation of transformed host cells for protein production is well known and widely used in the art. Therefore, the invention as a whole would have been prima facie obvious to a person of ordinary skill in the art at the time the invention was made.

Claim 15 is partially drawn to an expression vector which comprises a polynucleotide wherein said polynucleotide comprises the complete complement of a polynucleotide which hybridizes under any conditions to the polynucleotide of SEQ ID NO: 1.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make a vector which comprises the complete complement of the yeast polynucleotide of Arino et al. A person of ordinary skill in the art is motivated to construct such a vector for further functional characterization of the yeast ROC protein since such a vector can produce a polynucleotide (mRNA) which can block expression of the yeast ROC gene. One of ordinary skill in the art has a reasonable expectation of success at making the vector since vector construction is well known and widely used in the art. Therefore, the invention as a whole would have been prima facie obvious to a person of ordinary skill in the art at the time the invention was made.

Comments

21. It is noted that Kamura et al. (Science 284:657-661, April 1999) teaches a polynucleotide and a polypeptide which are identical to those of SEQ ID NO: 1 and 2, respectively. Kamura et al. refer to their polypeptide as Rbx1 (ring box protein 1). See attached alignment.

Allowable Subject Matter

22. Claims 3-4 appear to be allowable over the prior art of record but are objected to since they depend upon rejected claim 1.

Conclusion

23. No claim is in condition for allowance.

24. Applicants are requested to submit a clean copy of the pending claims (including amendments, if any) in future written communications to aid in the examination of this application.

25. Certain papers related to this application may be submitted to Art Unit 1652 by facsimile transmission. The FAX number is (703) 308-4556. The faxing of such papers must conform with the notices published in the Official Gazette, 1156 OG 61 (November 16, 1993) and 1157 OG 94 (December 28, 1993) (see 37 CFR 1.6(d)). NOTE: If Applicant submits a paper by FAX, the original copy should be retained by Applicant or Applicant's representative. NO DUPLICATE COPIES SHOULD BE SUBMITTED, so as to avoid the processing of duplicate papers in the Office.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Delia M. Ramirez whose telephone number is (703) 306-0288. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Ponnathapura Achutamurthy can be reached on (703) 308-3804. Any inquiry of

a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0196.

Delia M. Ramirez, Ph.D.
Patent Examiner
Art Unit 1652

DR
April 28, 2003

REBECCA E. PROUTY
PRIMARY EXAMINER
GROUP 1600